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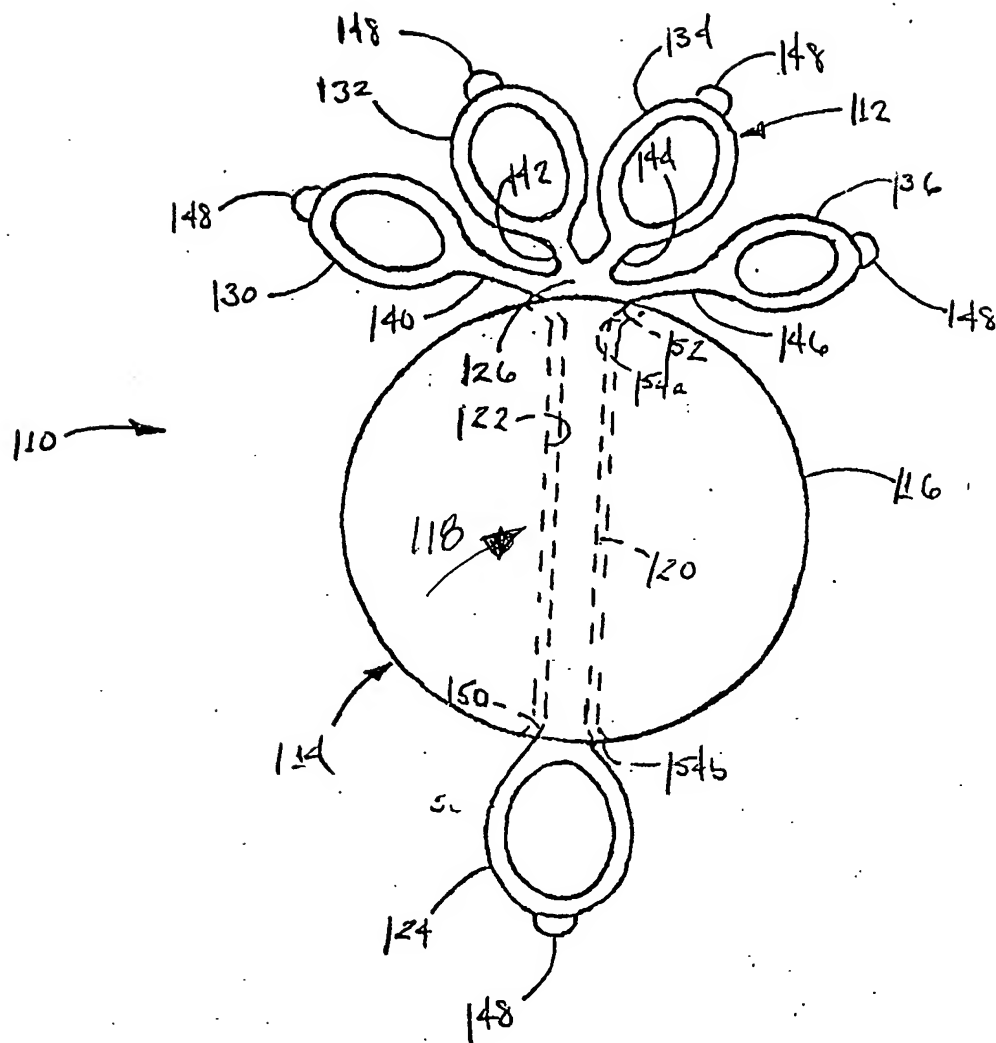


FIG. 1

PRIOR ART

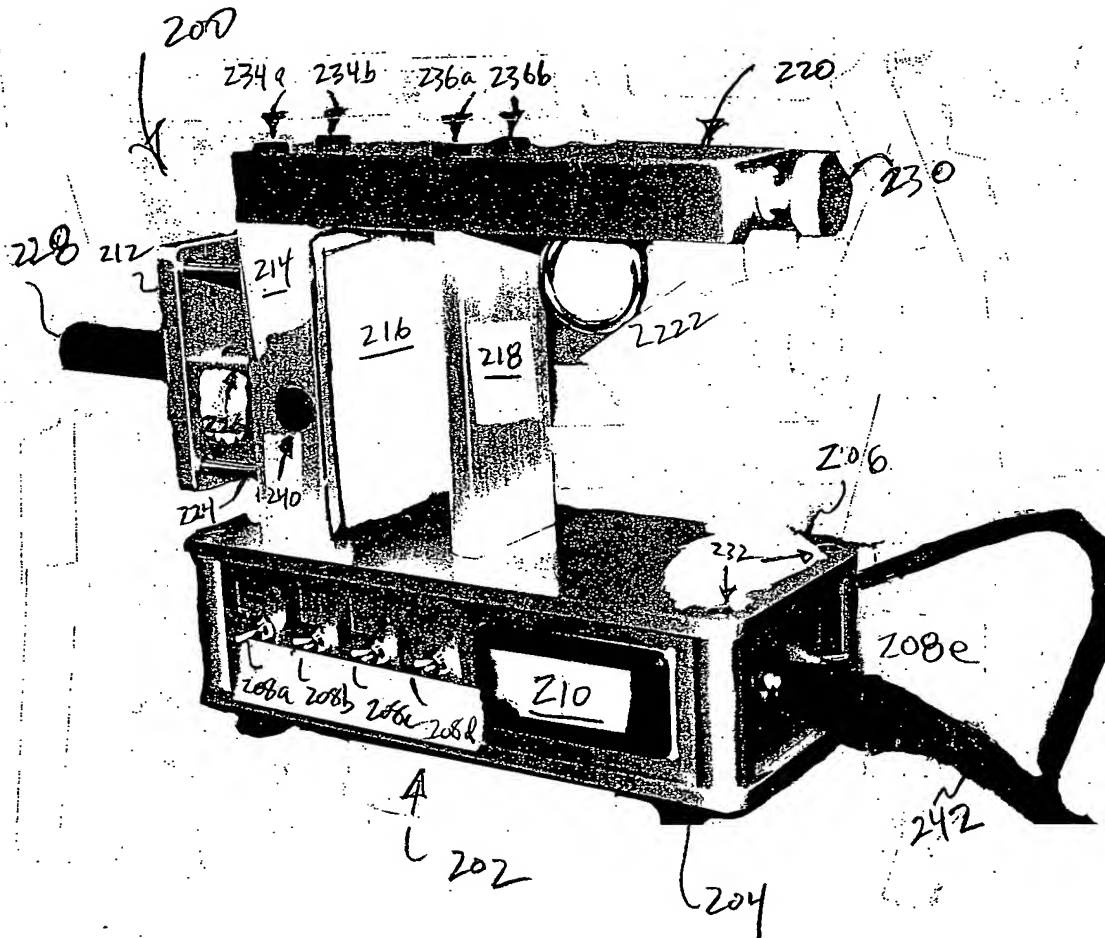


FIG 2A

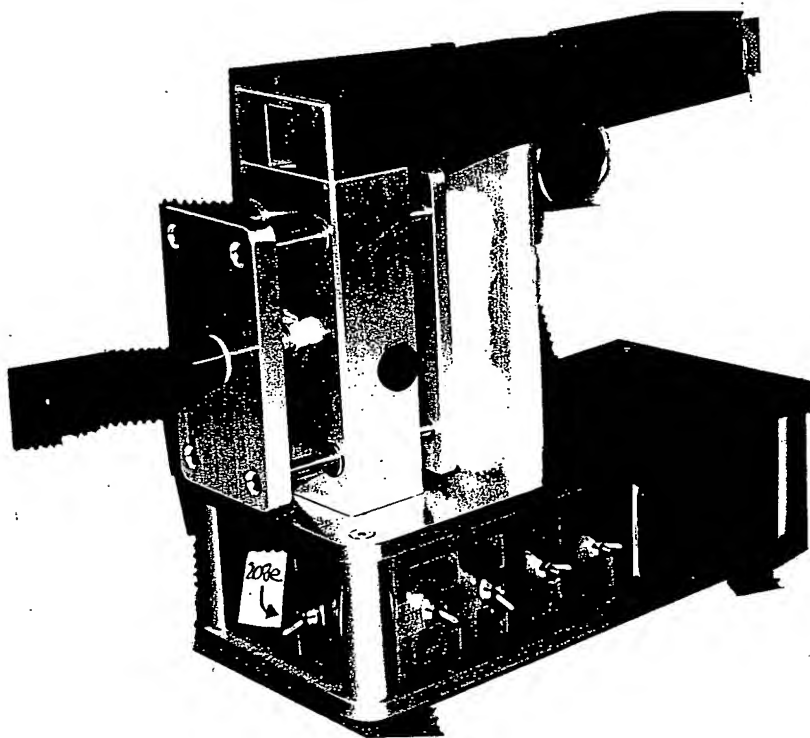


FIG. 2B

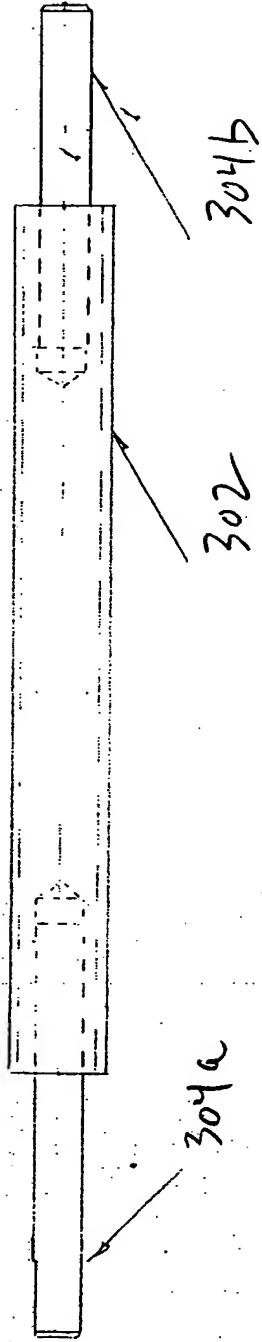


Fig. 4

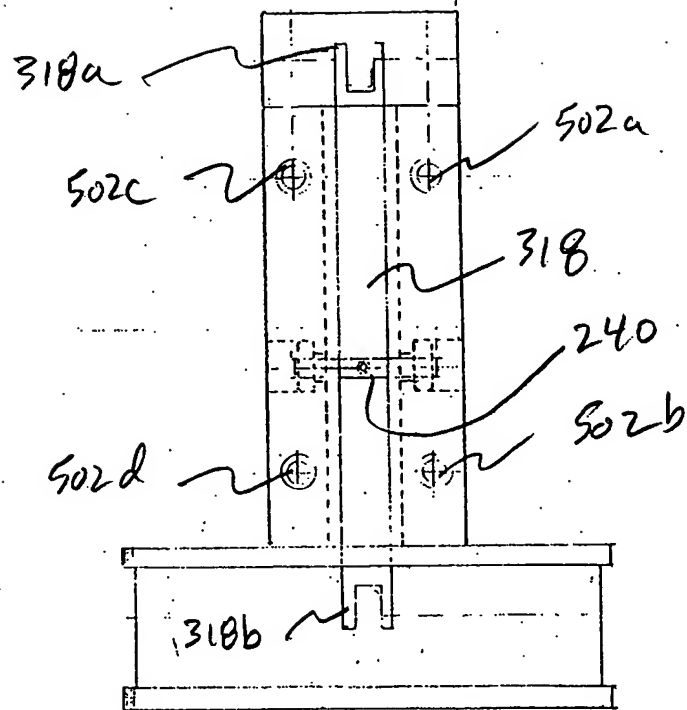


FIG. 5

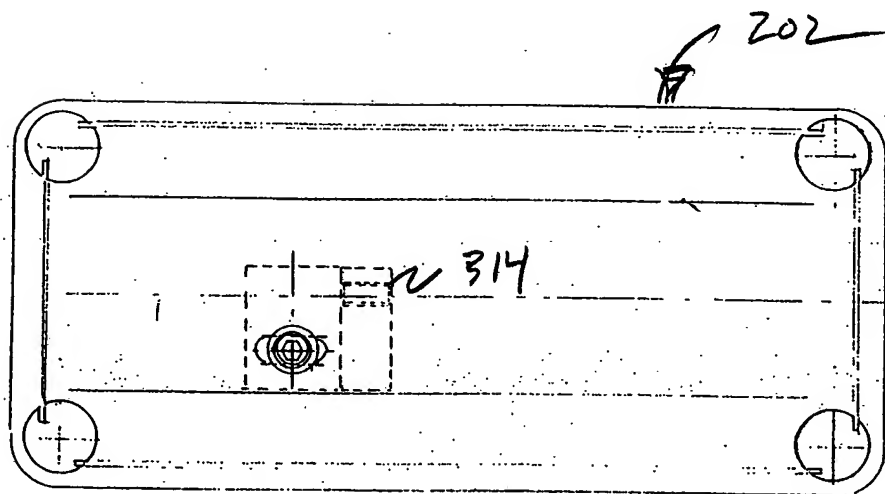


FIG. 6

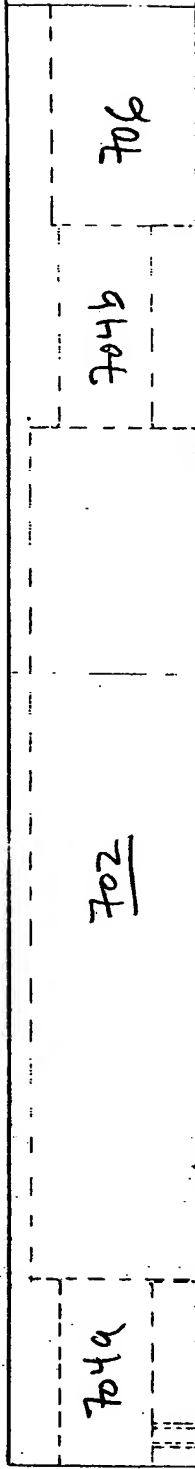


FIG. 7B

220

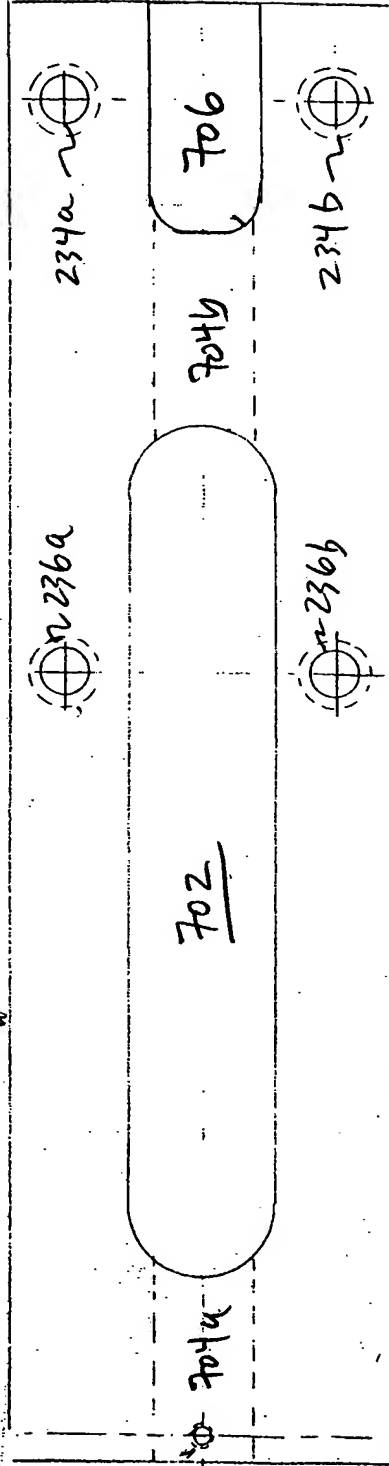


FIG. 7A

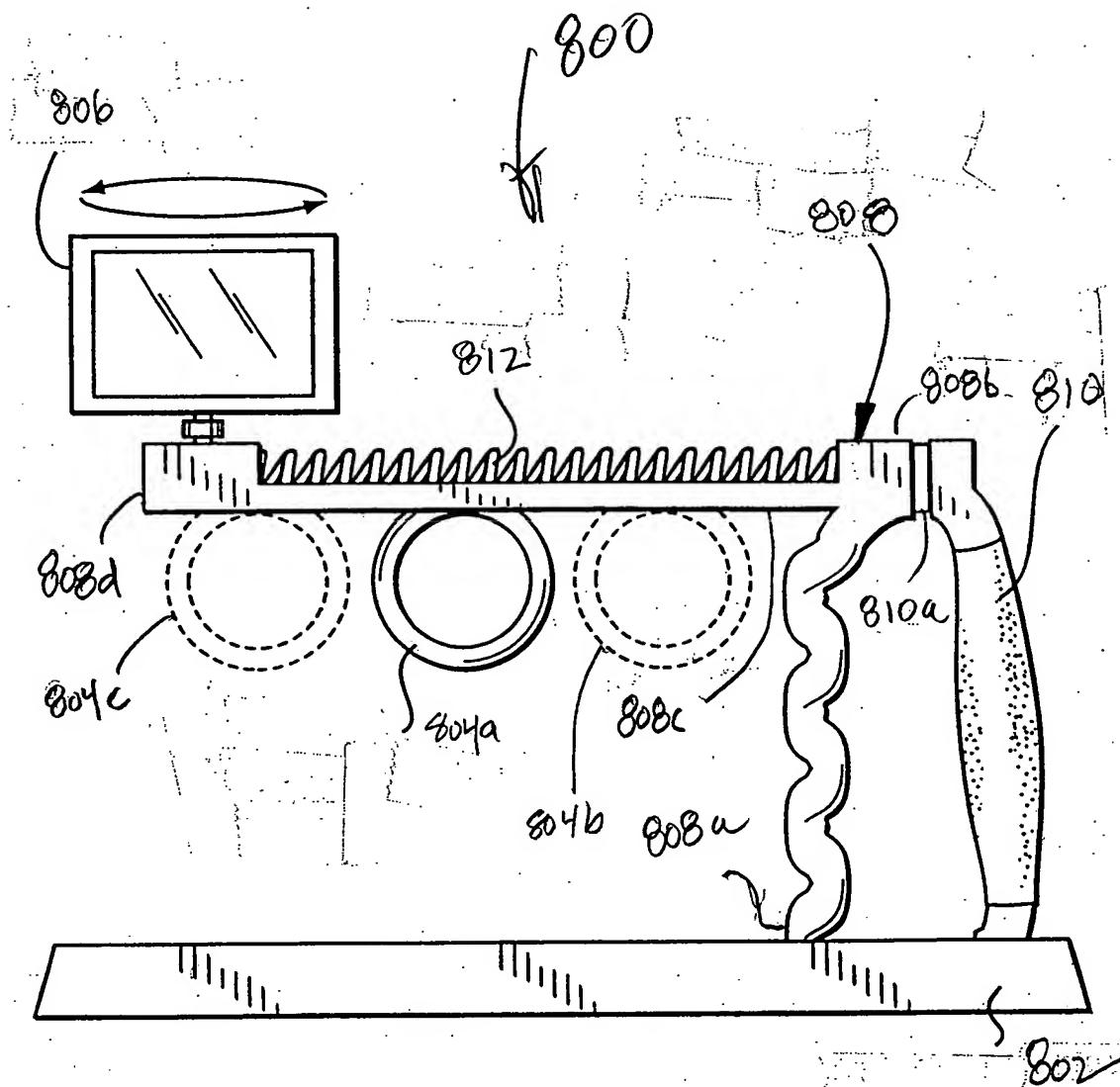


FIG. 8A

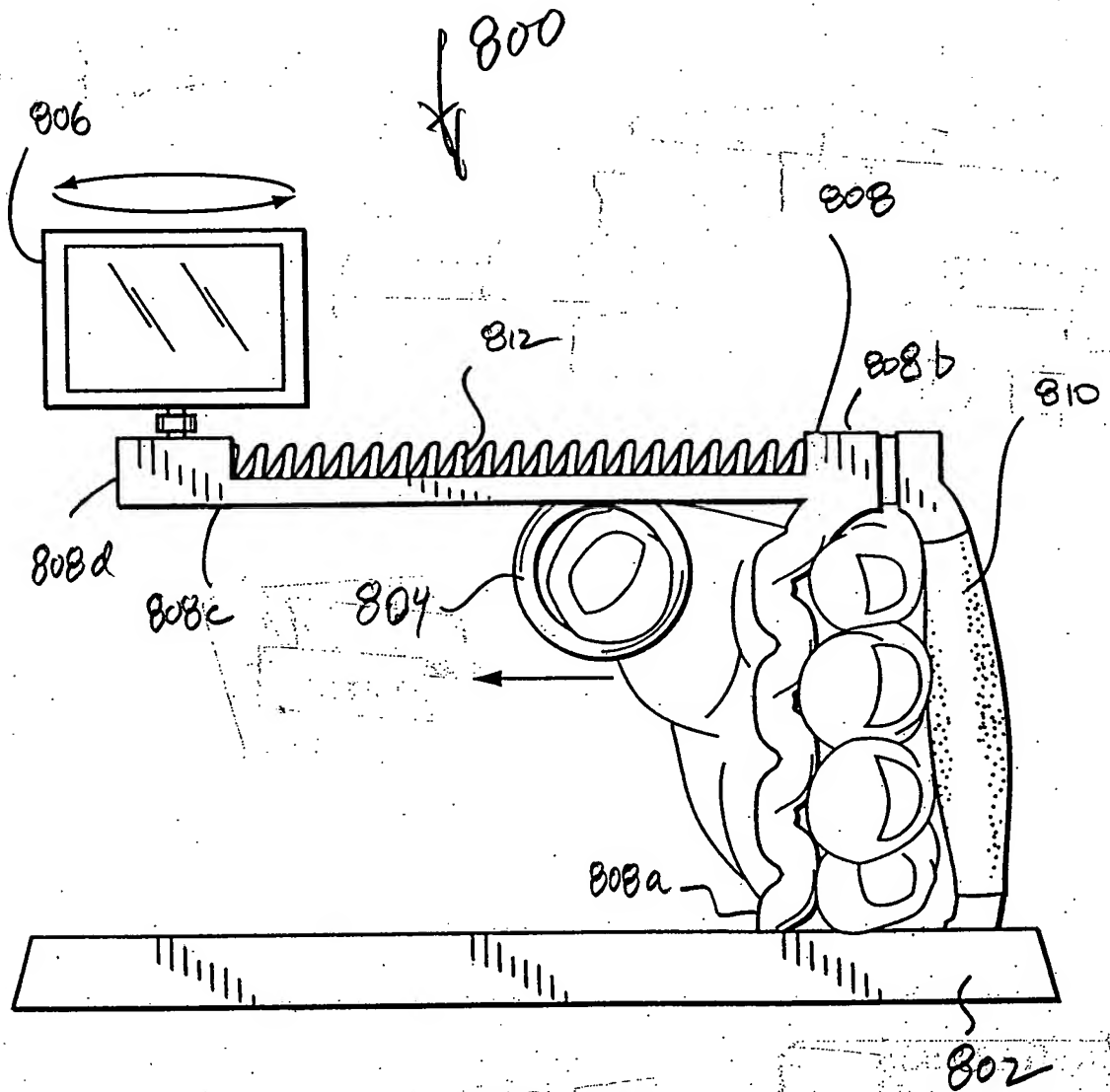


FIG. 8B

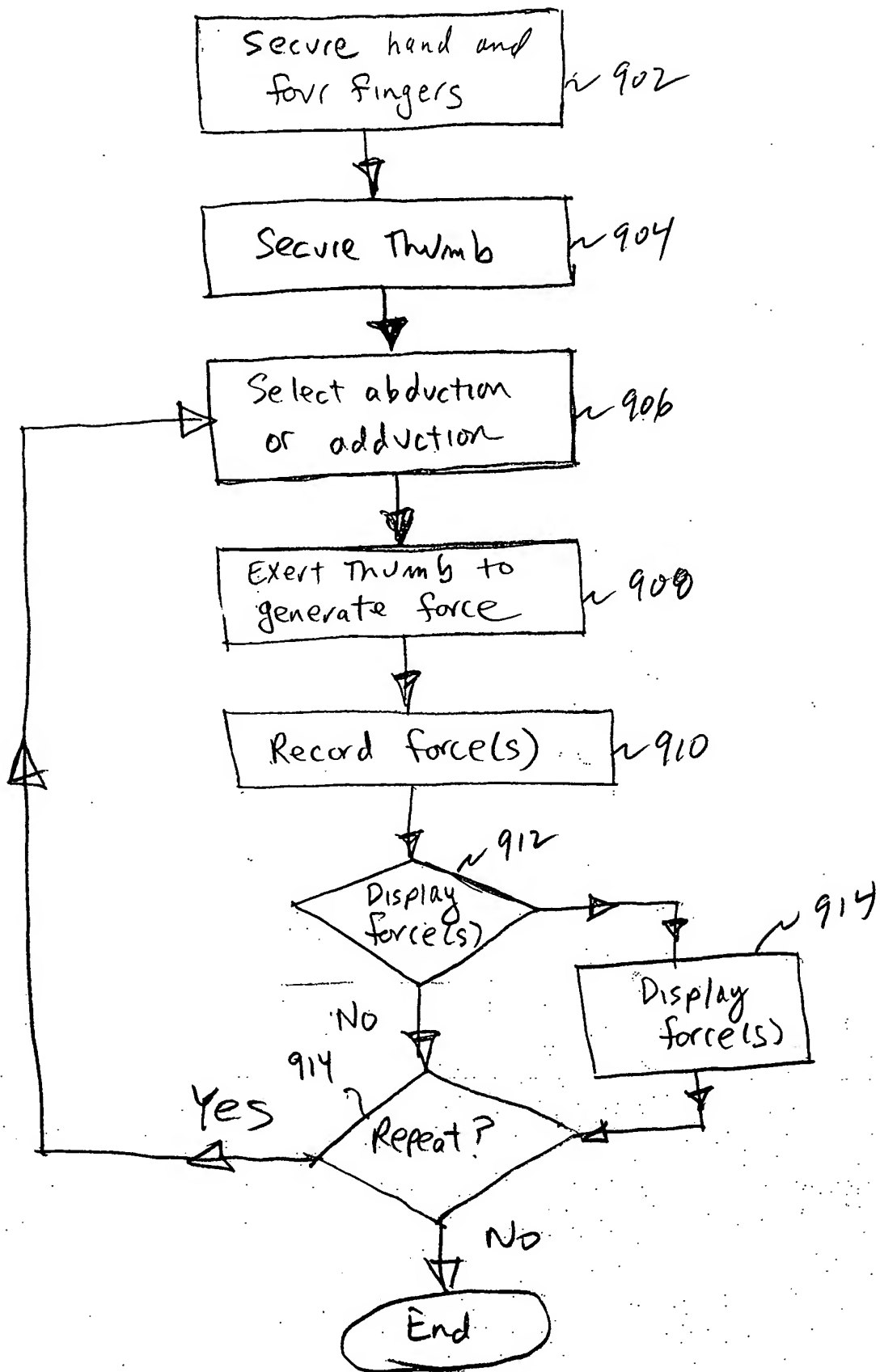


FIG. 9

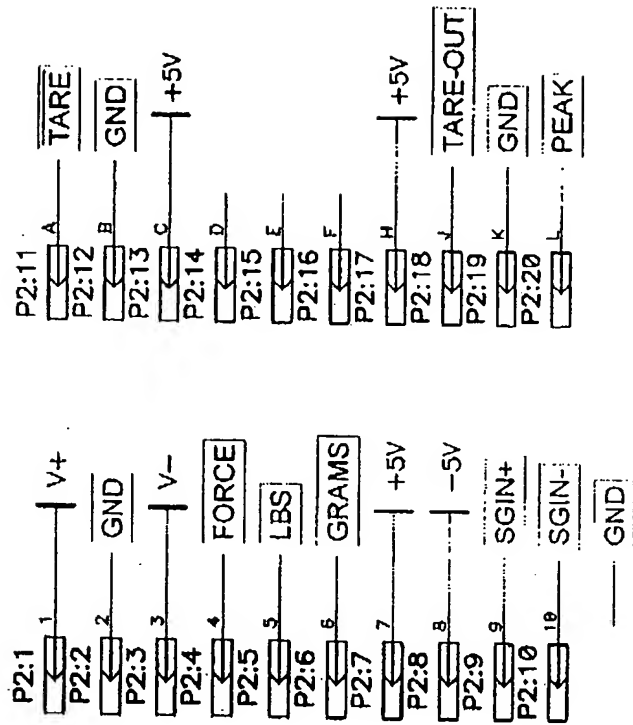


Fig. 10

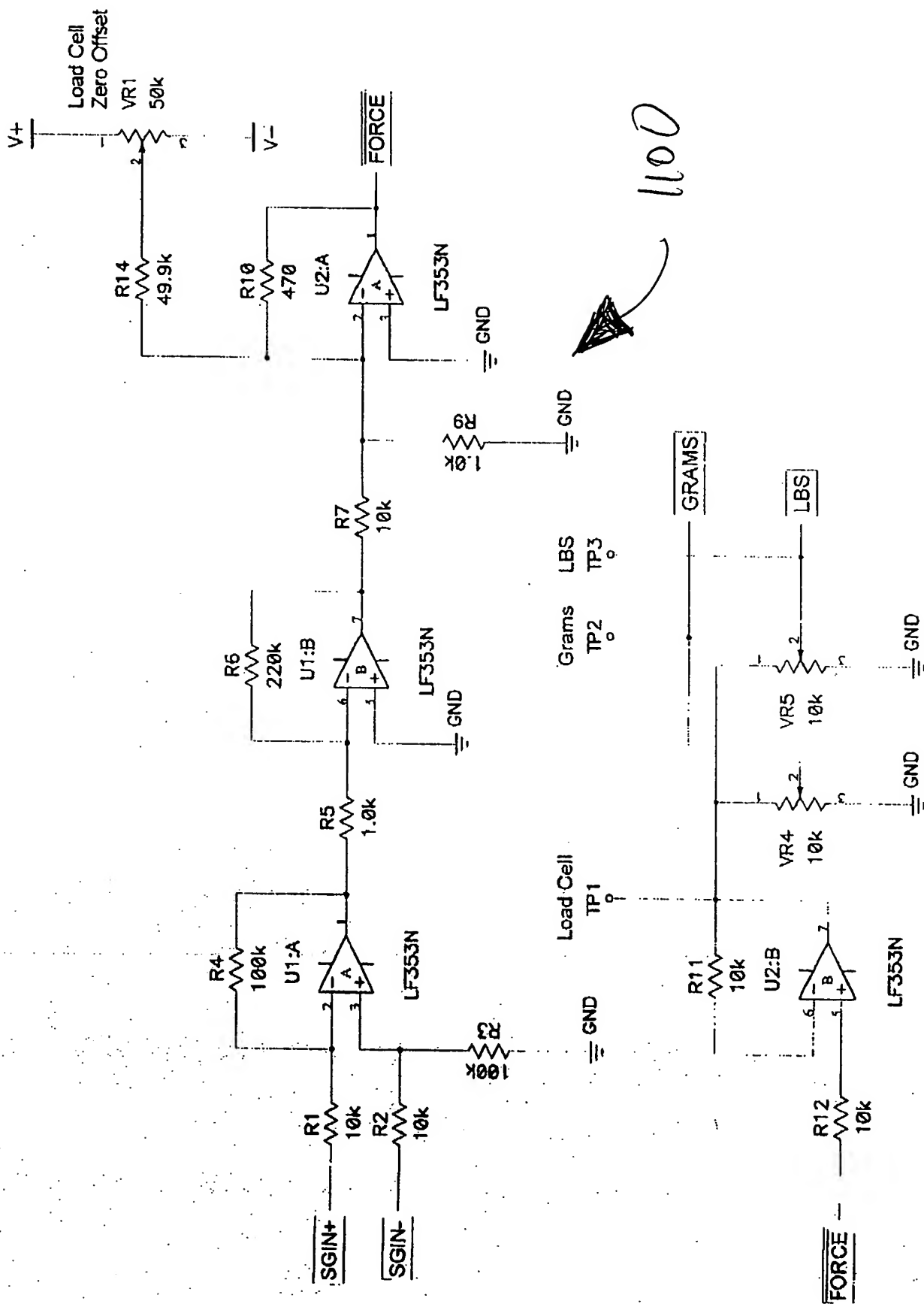


Fig. 11

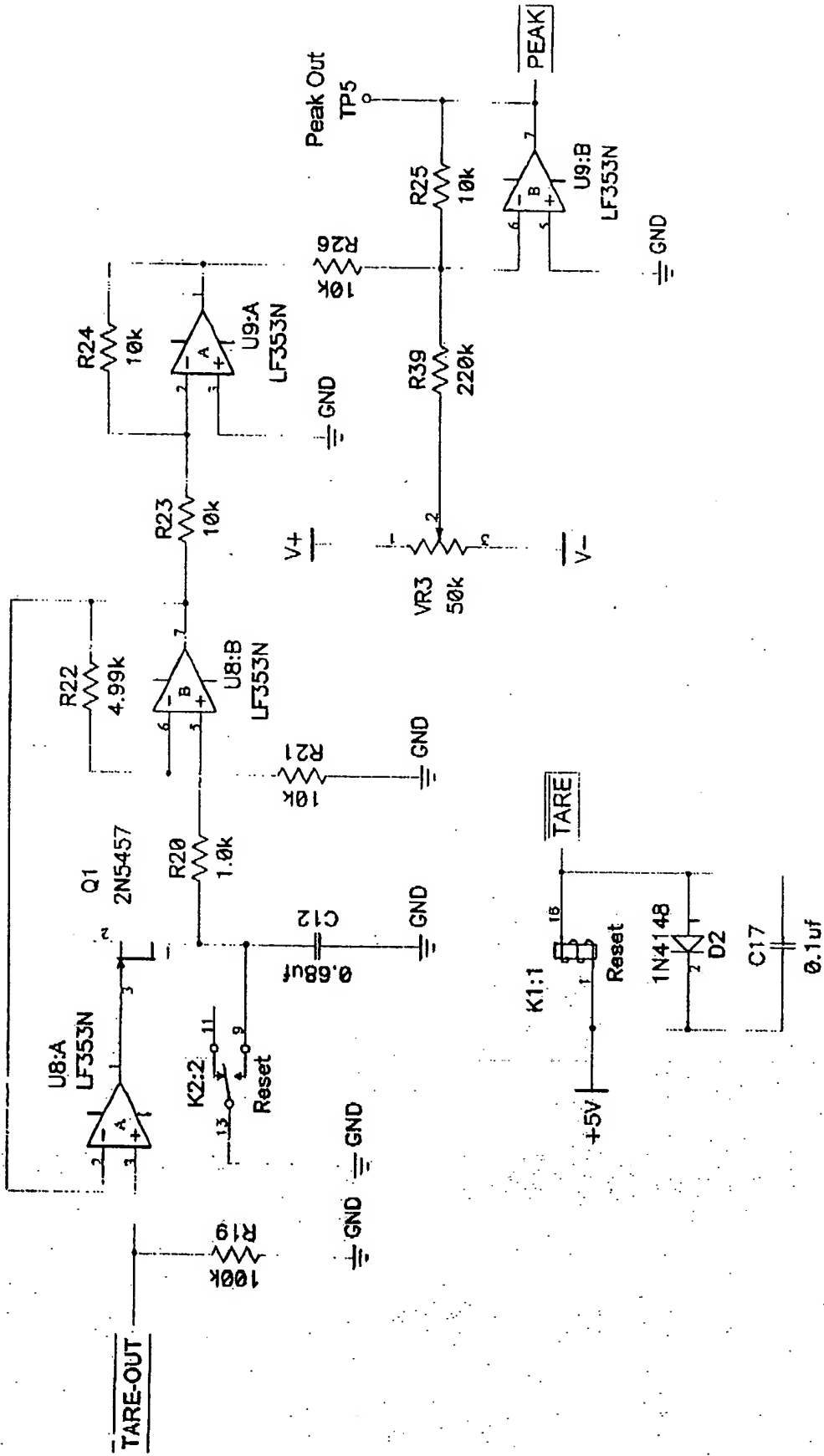


Fig. 12

+5V

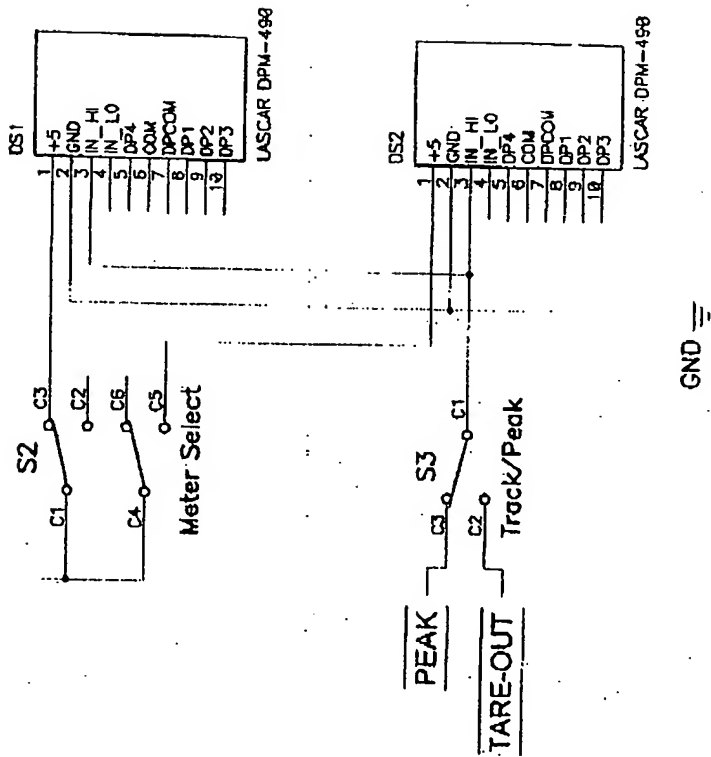


Fig. 13

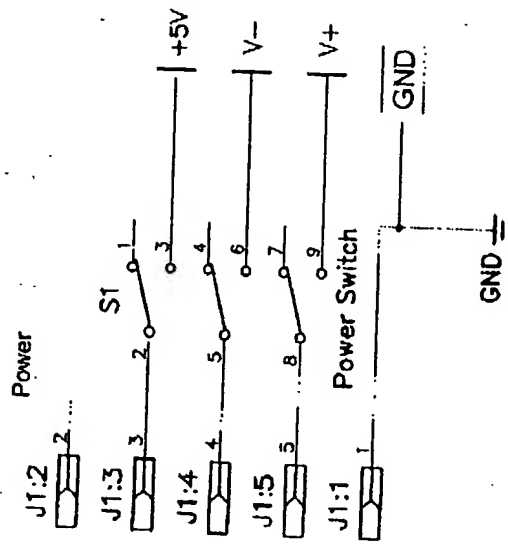


Fig. 14

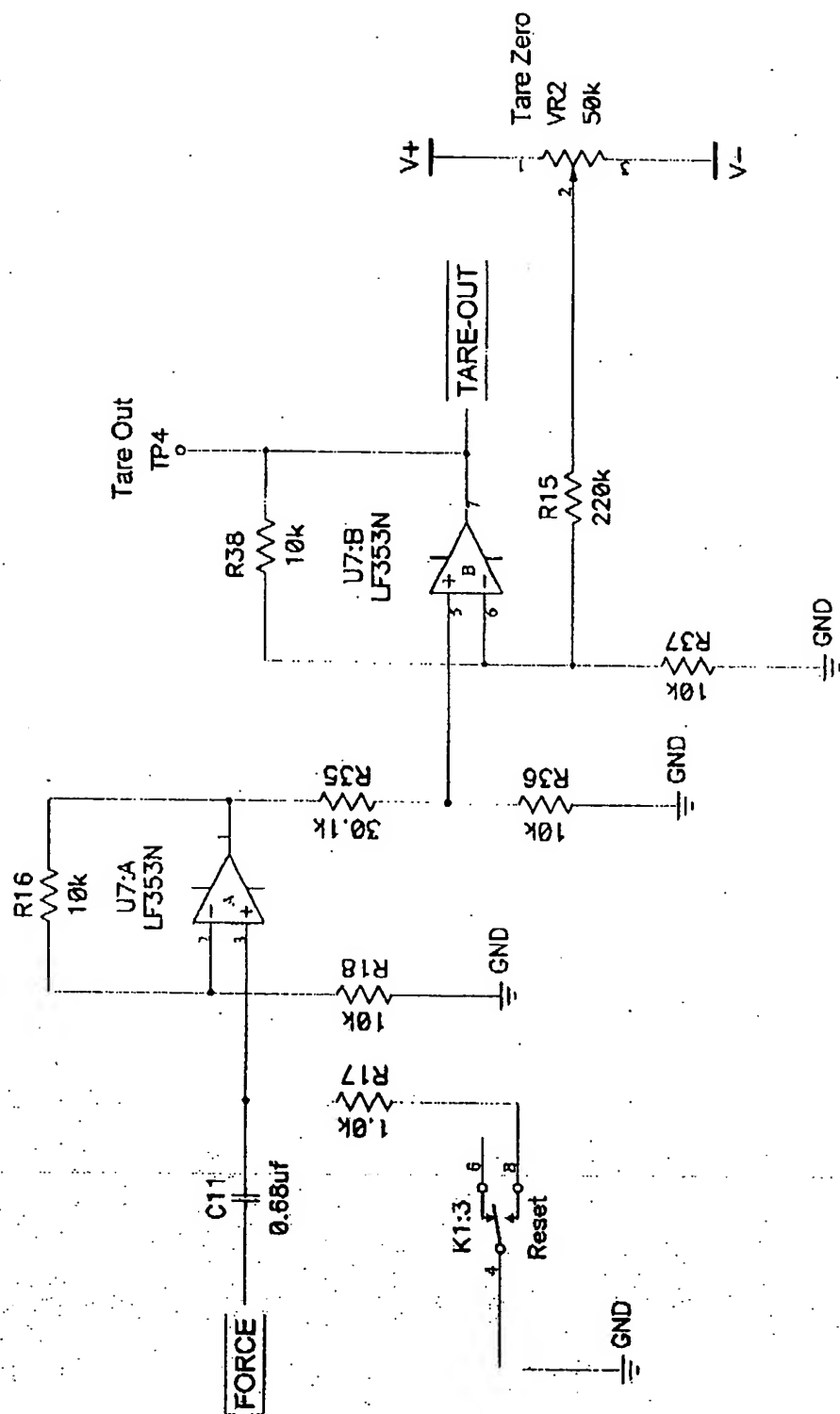


Fig. 15

Characteristics of Subjects: Age, Weight, Sex for Right Dominant												
Age	Male-Weight										Total	
	50-99	100-124	125-149	150-174	175-199	200-224	225-249	250-300				Total
5 to 9	2	12	9									23
10 to 14			9	10	3							22
15 to 19			3	16	5	2						26
20 to 24			2	8	11	3						24
25 to 29			2	6	11	1	1					21
30 to 34			1	7	11	4		1				25
35 to 39			1	3	9	3	3					19
40 to 44			1	4	12	5	2	1				25
45 to 49			1	2	12	7	3	1				26
50 to 54			2	6	10	1	1					20
55 to 59			3	7	9	3						23
60 to 64			4	8	6	3						21
65 to 69												
Total	2	12	38	77	99	32	12	3				275
Age	Female-Weight										Grand Total	
	50-99	100-124	125-149	150-174	175-199	200-224	225-249	250-300				Total
5 to 9	2	2										4
10 to 14	3	17	4	2								24
15 to 19		8	13	3								23
20 to 24		4	15	6	2							24
25 to 29	1	8	8	1	1							25
30 to 34			12	4	6							22
35 to 39	1	8	10	7	4		1					31
40 to 44			9	8	2	2						21
45 to 49			8	15		1						24
50 to 54			4	13	2	1						20
55 to 59			11	6	3							20
60 to 64			5	8	6		1					20
65 to 69			5	9	7							21
Total	5	45	104	81	33	4	3					275

Fig. 16

Joint Age Weight Abduction-Right

Joint Age Weight Abduction-Right										Joint Age Weight Abduction-Right									
Male-Weight										Female-Weight									
Age	50-99	100-124	125-149	150-174	175-199	200-224	225-249	250-300	50-99	100-124	125-149	150-174	175-199	200-224					
5 to 9									1.9	2.5	2.7								
10 to 14		2.6	3.1							2.8	2.7								
15 to 19			3.8	4.9	5.3					3.7	3.0	2.6							
20 to 24			4.3	6.0	6.8					2.2	3.3	3.5							
25 to 29				5.8	6.2	5.4													
30 to 34				4.4	5.7														
35 to 39				5.1	5.9	6.7							3.0						
40 to 44				4.2	4.6	5.4	5.4			2.7	3.1	2.9	4.0						
45 to 49				4.5	5.2	6.1													
50 to 54					5.3	6.8	6.9												
55 to 59				3.3	5.0														
60 to 64			4.0	3.8	3.5	5.7													
65 to 69			3.3	3.7	4.4	4.4													
Angle = 30°																			
5 to 9									1.3	2.0	2.2								
10 to 14		2.2	2.6	4.4	4.4					2.4	2.3								
15 to 19			3.3	5.4	5.9					3.0	2.6	2.2							
20 to 24			4.0	5.2	5.6	4.3				1.7	2.9	2.8							
25 to 29				3.8	4.8						2.4	2.4	2.4						
30 to 34				3.8	5.1	5.8				2.0	2.5	2.4	3.6						
35 to 39				2.8	3.9	4.2	4.7				2.6	2.4							
40 to 44				3.8	4.8	5.3					2.4	2.6							
45 to 49					4.8	6.4	6.3				3.0	2.1							
50 to 54											2.5	2.7	2.6						
55 to 59			3.8	3.3	3.1	4.9					1.5	2.5	2.5						
60 to 64			3.0	3.3	4.1	3.7					2.1	2.3	2.7						
65 to 69																			
Angle = 45°																			
5 to 9																			
10 to 14		1.5	1.9	3.4	4.3				0.8	1.2	1.6								
15 to 19			2.7	3.9	5.2					1.8	1.7								
20 to 24			3.0	3.8	4.3					2.3	1.9	2.0							
25 to 29				3.8	4.3	2.8				1.2	2.0	2.2							
30 to 34				2.9	3.8						2.0	2.2	1.7						
35 to 39				3.0	3.9	5.6				1.2	2.0	1.9	2.3						
40 to 44				2.7	3.1	2.9	3.5				1.8	1.8							
45 to 49				3.4	3.7	3.8					1.7	2.1							
50 to 54					3.4	3.7	4.2				2.2	1.4							
55 to 59				2.3	3.1						1.8	2.2	1.9						
60 to 64			3.0	2.5	2.3	4.1					0.8	1.8	1.7						
65 to 69			2.2	2.7	3.1	2.8					1.5	1.5	1.9						
Angle = 60°																			

Fig. 17

Joint Age Weight Abduction-Left

Joint Age Weight Abduction-Left		Joint Age Weight Abduction-Left									
Joint Age Weight Abduction-Left		Male-Weight					Female-Weight				
Age	Weight	50-59	60-69	70-79	80-89	90-99	100-109	110-119	120-129	130-139	140-149
5 to 9	2.3	2.7	3.4	4.7	5.5	6.5	7.4	8.4	9.4	10.4	11.4
10 to 14	3.4	3.9	4.4	4.9	5.4	5.9	6.4	6.9	7.4	7.9	8.4
15 to 19	3.9	4.4	4.9	5.4	5.9	6.4	6.9	7.4	7.9	8.4	8.9
20 to 24	4.4	4.9	5.4	5.9	6.4	6.9	7.4	7.9	8.4	8.9	9.4
25 to 29	4.9	5.4	5.9	6.4	6.9	7.4	7.9	8.4	8.9	9.4	9.9
30 to 34	5.4	5.9	6.4	6.9	7.4	7.9	8.4	8.9	9.4	9.9	10.4
35 to 39	5.9	6.4	6.9	7.4	7.9	8.4	8.9	9.4	9.9	10.4	10.9
40 to 44	6.4	6.9	7.4	7.9	8.4	8.9	9.4	9.9	10.4	10.9	11.4
45 to 49	6.9	7.4	7.9	8.4	8.9	9.4	9.9	10.4	10.9	11.4	11.9
50 to 54	7.4	7.9	8.4	8.9	9.4	9.9	10.4	10.9	11.4	11.9	12.4
55 to 59	7.9	8.4	8.9	9.4	9.9	10.4	10.9	11.4	11.9	12.4	12.9
60 to 64	8.4	8.9	9.4	9.9	10.4	10.9	11.4	11.9	12.4	12.9	13.4
65 to 69	8.9	9.4	9.9	10.4	10.9	11.4	11.9	12.4	12.9	13.4	13.9
Angle = 30°		Angle = 30°									
5 to 9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
10 to 14	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1
15 to 19	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2
20 to 24	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3
25 to 29	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4
30 to 34	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5
35 to 39	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6
40 to 44	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7
45 to 49	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8
50 to 54	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
55 to 59	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0
60 to 64	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1
65 to 69	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2
Angle = 45°		Angle = 45°									
5 to 9	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4
10 to 14	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6
15 to 19	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8
20 to 24	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0
25 to 29	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.2
30 to 34	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4
35 to 39	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6
40 to 44	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8
45 to 49	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0
50 to 54	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2
55 to 59	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4
60 to 64	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6
65 to 69	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6	5.8
Angle = 60°		Angle = 60°									
5 to 9	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9
10 to 14	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	4.2
15 to 19	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	4.2	4.5
20 to 24	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	4.2	4.5	4.8
25 to 29	2.1	2.4	2.7	3.0	3.3	3.6	3.9	4.2	4.5	4.8	5.1
30 to 34	2.4	2.7	3.0	3.3	3.6	3.9	4.2	4.5	4.8	5.1	5.4
35 to 39	2.7	3.0	3.3	3.6	3.9	4.2	4.5	4.8	5.1	5.4	5.7
40 to 44	3.0	3.3	3.6	3.9	4.2	4.5	4.8	5.1	5.4	5.7	6.0
45 to 49	3.3	3.6	3.9	4.2	4.5	4.8	5.1	5.4	5.7	6.0	6.3
50 to 54	3.6	3.9	4.2	4.5	4.8	5.1	5.4	5.7	6.0	6.3	6.6
55 to 59	3.9	4.2	4.5	4.8	5.1	5.4	5.7	6.0	6.3	6.6	6.9
60 to 64	4.2	4.5	4.8	5.1	5.4	5.7	6.0	6.3	6.6	6.9	7.2
65 to 69	4.5	4.8	5.1	5.4	5.7	6.0	6.3	6.6	6.9	7.2	7.5

Fig. 18

Joint Age Weight Adduction-Right

Joint Age Weight Adduction-Right														
Male-Weight										Female-Weight				
Ag	50-99	100-124	125-149	150-174	175-199	200-224	225-249	250-300	50-99	100-124	125-149	150-174	175-199	200-224
5 to 9									10.9	10.7	11.9			
10 to 14		11.8	12.8							11.0	13.5			
15 to 19			14.3	16.2	16.4					13.2	14.4	14.0		
20 to 24			15.2	17.4	18.5					10.8	15.2	16.0		
25 to 29				17.8	19.7	20.8					12.9	16.4	16.2	
30 to 34				17.4	17.4					12.0	14.1	14.4	12.2	
35 to 39				18.5	16.9	19.2					13.7	12.9		
40 to 44				17.1	16.0	20.9	18.0				12.0	14.8		
45 to 49				15.3	17.1	18.2	15.6				13.1	13.8		
50 to 54				14.3	16.1	17.3					13.5	16.2	15.6	
55 to 59				13.8	12.4	16.3					12.0	13.0	13.3	
60 to 64			12.9	13.4	15.5	13.1					11.0	12.3	14.1	
65 to 69			12.6											
Angle = 30°														
5 to 9									11.9	11.3	12.8			
10 to 14		11.9	13.3	18.0	18.6					12.7	15.0			
15 to 19			15.9	18.4	20.7					14.9	15.1	15.2		
20 to 24			18.0	19.1	21.3	20.9				11.6	16.6	17.8		
25 to 29				19.4	18.8						14.2	17.4	17.2	
30 to 34				20.7	18.4	19.2				12.6	14.9	15.7	15.4	
35 to 39				17.5	16.2	19.9	20.4				14.5	13.7		
40 to 44				16.9	19.1	19.4					13.4	16.1		
45 to 49					18.2	18.9	16.9				15.7	15.1		
50 to 54				14.6	17.5						15.1	16.9	17.5	
55 to 59			12.4	15.6	13.6	17.1					11.9	14.9	14.7	
60 to 64			13.5	14.6	16.5	15.4					12.7	12.8	15.1	
65 to 69														
Angle = 45°														
5 to 9									12.5	13.2	14.2			
10 to 14		13.2	14.2	19.3	19.1					13.4	16.0			
15 to 19			17.5	20.5	21.7					15.8	16.7	14.9		
20 to 24			20.3	21.2	22.2	22.1				12.3	18.4	18.9		
25 to 29				20.3	20.9						15.0	19.3	15.7	
30 to 34				21.8	20.3	20.3				14.1	17.1	17.1	14.4	
35 to 39				20.7	18.1	22.1	21.2				16.8	14.6		
40 to 44				18.5	20.5	21.1	19.0				14.4	16.4		
45 to 49					20.3	21.1					15.5	15.8		
50 to 54				15.4	18.8						15.7	17.6	17.9	
55 to 59			14.2	16.1	15.2	19.1					12.7	15.6	15.8	
60 to 64			14.8	15.8	17.6	16.4					13.2	14.3	16.0	
65 to 69														
Angle = 60°														

Fig. 19

Joint Age Weight Adduction-Left

Joint Age Weight Adduction-Left														
Male-Weight										Female-Weight				
Age	50-99	100-124	125-149	150-174	175-199	200-224	225-249	250-300	50-99	100-124	125-149	150-174	175-199	200-224
5 to 9														
10 to 14		10.8	12.5						10.1	10.2	12.4			
15 to 19			13.9	16.3	19.0					11.5	12.4			
20 to 24			15.0	16.7	17.0					12.7	13.4	12.7		
25 to 29				17.2	18.9	14.4				12.1	13.9	14.6		
30 to 34				17.3	16.8						12.1	15.6	16.0	
35 to 39				19.5	16.5	17.8				12.2	13.2	14.4	13.2	
40 to 44				14.5	15.7	18.9	17.9				12.3	12.2		
45 to 49				15.6	17.3	17.9	15.3				10.5	14.0		
50 to 54					17.2	16.3					12.7	12.7		
55 to 59				12.4	15.4						13.1	14.4	13.5	
60 to 64			11.5	13.5	11.6	16.2					11.1	12.7	12.8	
65 to 69			12.9	13.3	14.3	14.7					11.0	11.8	12.9	
Angle = 30°														
5 to 9														
10 to 14		12.1	13.4						11.3	10.2	12.9			
15 to 19			15.8	18.1	20.9					10.8	13.4			
20 to 24			16.3	18.3	19.8					13.7	14.4	14.1		
25 to 29				18.7	21.0	20.6				11.9	15.2	17.2		
30 to 34				17.0	18.1						13.8	16.9	18.4	
35 to 39				20.7	18.8	18.2				12.0	14.6	16.5	13.7	
40 to 44				14.2	15.8	18.5	17.8				12.5	12.1		
45 to 49				15.7	17.8	18.3					11.1	15.1		
50 to 54					18.5	17.3	16.6				15.1	13.5		
55 to 59				13.6	17.6						14.7	14.5	15.8	
60 to 64			11.2	15.1	13.2	16.5					12.1	13.9	15.1	
65 to 69			13.3	14.4	16.0	16.8					12.6	13.2	14.3	
Angle = 45°														
5 to 9														
10 to 14		12.4	14.5						11.6	10.8	13.8			
15 to 19			17.1	19.2	20.3					11.6	15.4			
20 to 24			17.7	20.7	20.9					14.7	15.7	14.9		
25 to 29				20.1	22.3	21.8				11.8	16.5	18.3		
30 to 34				18.6	19.7						13.9	18.4	16.8	
35 to 39				21.3	20.2	20.3				12.8	15.2	15.7	14.3	
40 to 44				16.1	17.3	21.0	19.0				13.6	13.2		
45 to 49				17.4	20.2	20.9					12.8	16.3		
50 to 54					20.1	20.1	18.4				16.0	14.6		
55 to 59				15.3	19.2						16.0	16.4	18.7	
60 to 64			11.4	15.6	14.4	18.7					13.3	15.8	16.5	
65 to 69			14.2	15.1	17.9	17.2					13.6	14.4	15.0	
Angle = 60°														

FIG. 20

Grip Strength by Age and Weight for Male and Female Left and Right

Male Left / Right Grip

Weight	50 to 99	100 to 124	125 to 149	150 to 174	175 to 199	200 to 224	225 to 249	250 to 300
Age								
10 to 14		59/66	68/70	101/104	110/120			
15 to 19			93/97	118/125	130/137			
20 to 24			94/110	114/117	128/132	129/137		
25 to 29				105/108	120/126			
30 to 34			80/91	110/114	117/126	126/136		
35 to 39				94/96	105/108	128/139	111/119	
40 to 44				97/98	96/103	119/125		
45 to 49					97/100	106/110	105/113	
50 to 54				74/82	98/101			
55 to 59			70/82	81/86	77/83	95/102		
60 to 64			73/78	74/81	89/92	84/84		
65 to 69								

Female Left / Right Grip

Weight	50 to 99	100 to 124	125 to 149	150 to 174	175 to 199	200 to 224	225 to 249	250 to 300
Age								
10 to 14	56/56	63/59	74/70	82/82				
15 to 19		66/60	77/71	80/74				
20 to 24		84/78	78/71	83/77				
25 to 29		58/51	81/74	81/84	79/75			
30 to 34			72/64	80/73	81/80			
35 to 39		66/61	79/72	71/69				
40 to 44			65/62	75/72				
45 to 49			68/64	65/61				
50 to 54			66/65	72/70	77/73			
55 to 59			69/64	70/68	71/66			
60 to 64			58/54	69/65	75/69			
65 to 69			66/59					

MALE Abduction by Age Right Dominant

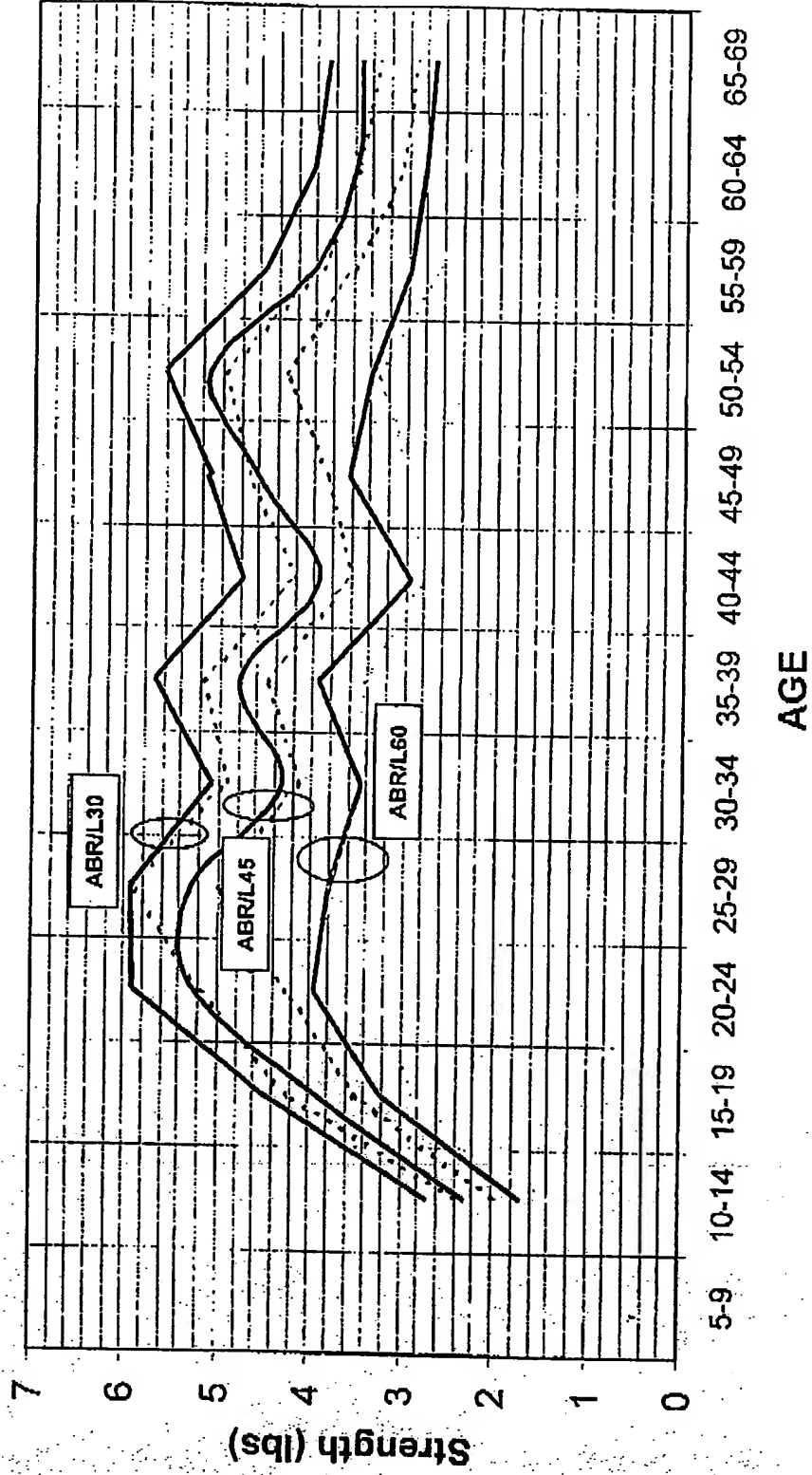


FIG. 22

FEMALE Abduction by Age Right Dominant

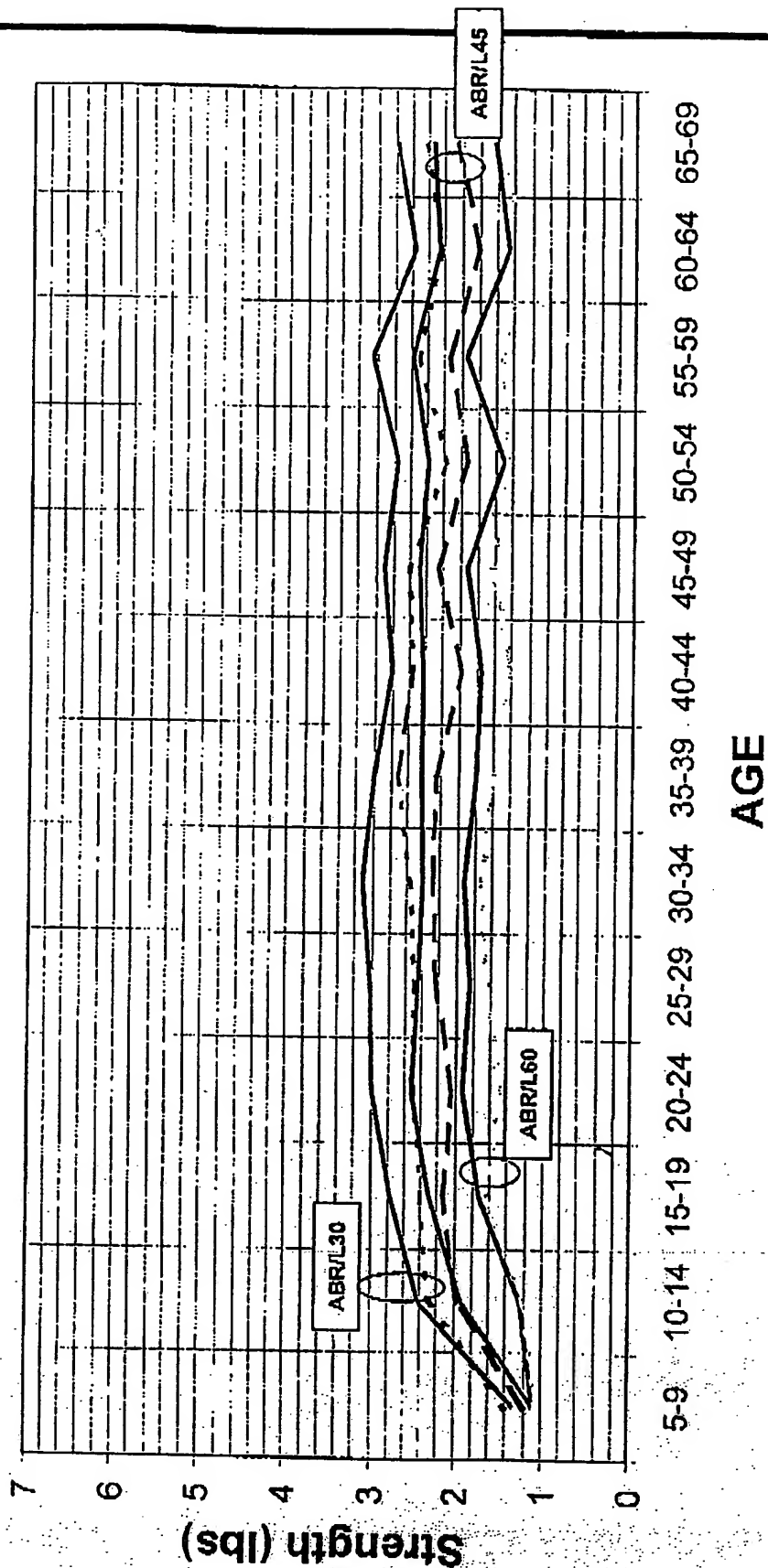


FIG. 23

MALE Abduction by Weight Right Dominant

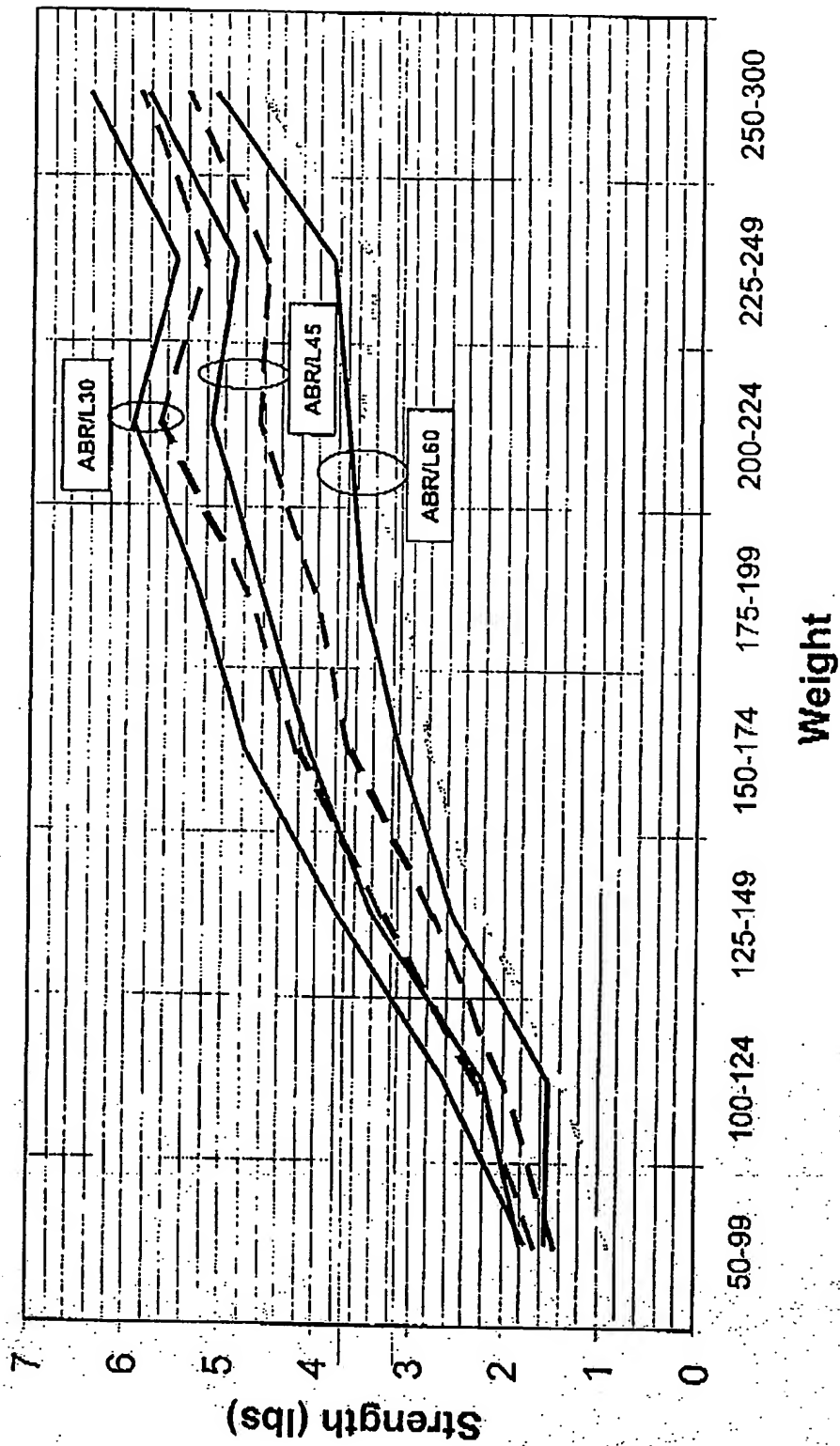


FIG. 24

FEMALE Abduction by Weight Right Dominant

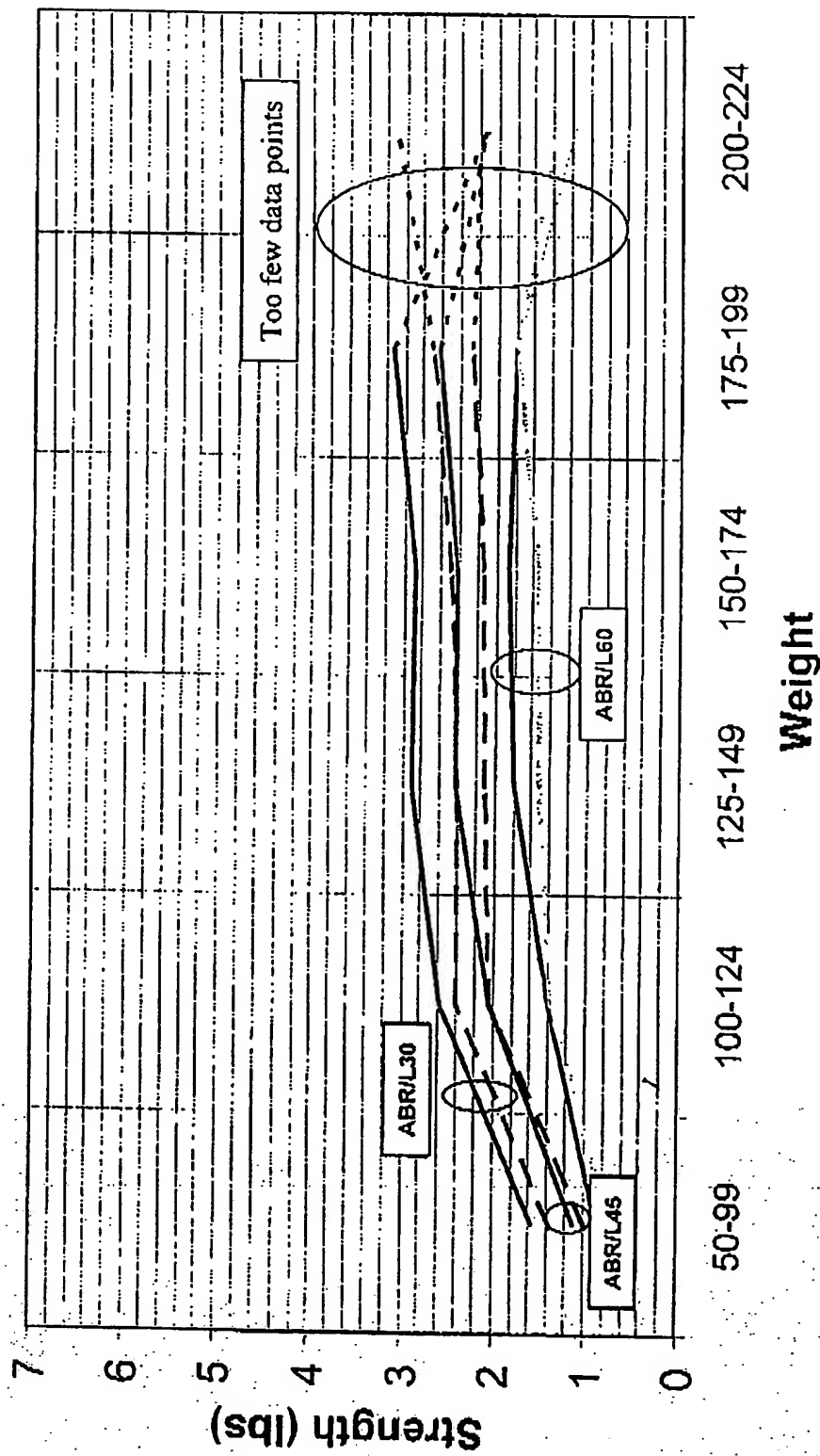


Fig. 25

MALE Adduction by Age Right Dominant

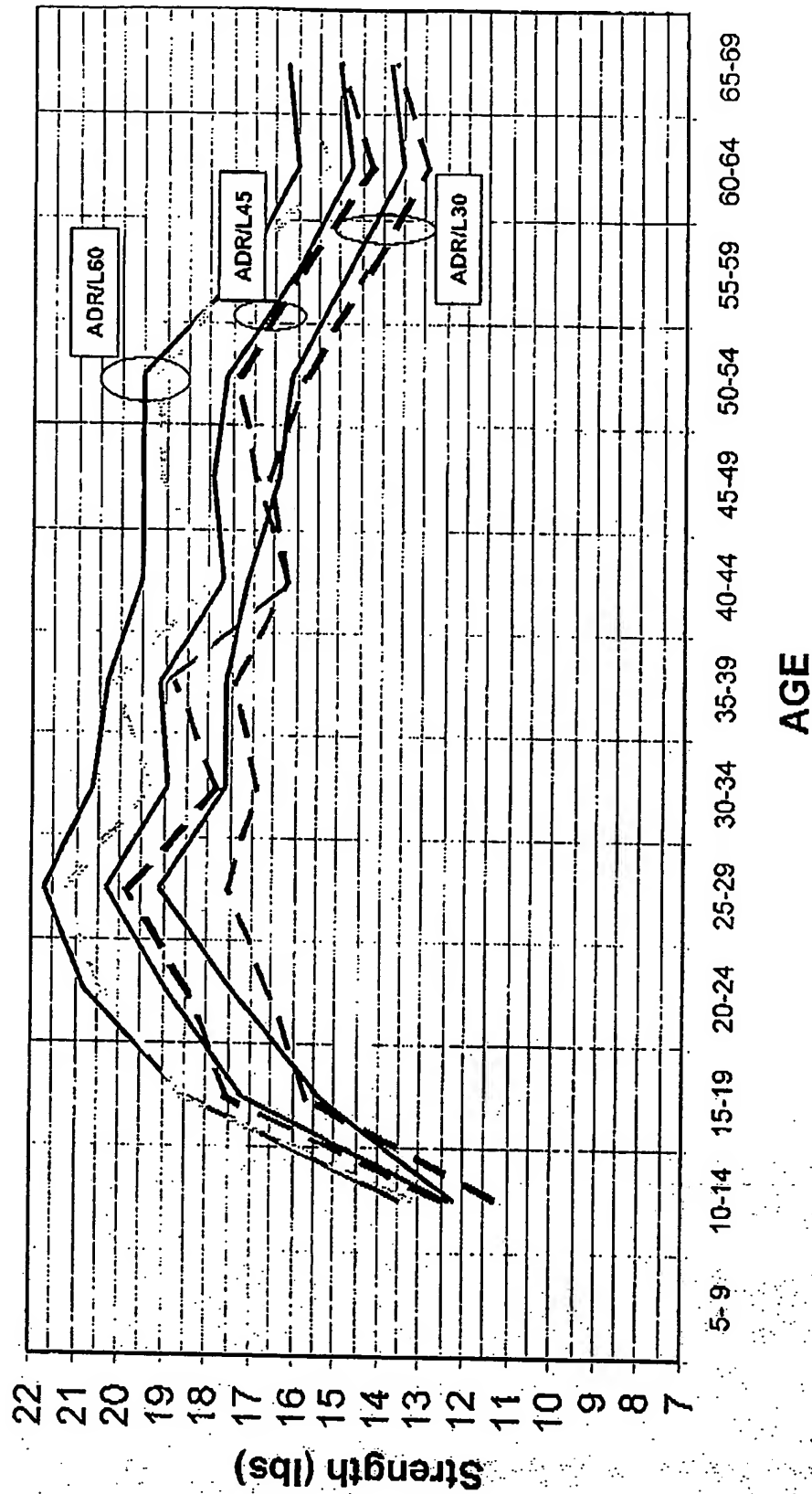


Fig. 26

FEMALE Adduction by Age Right Dominant

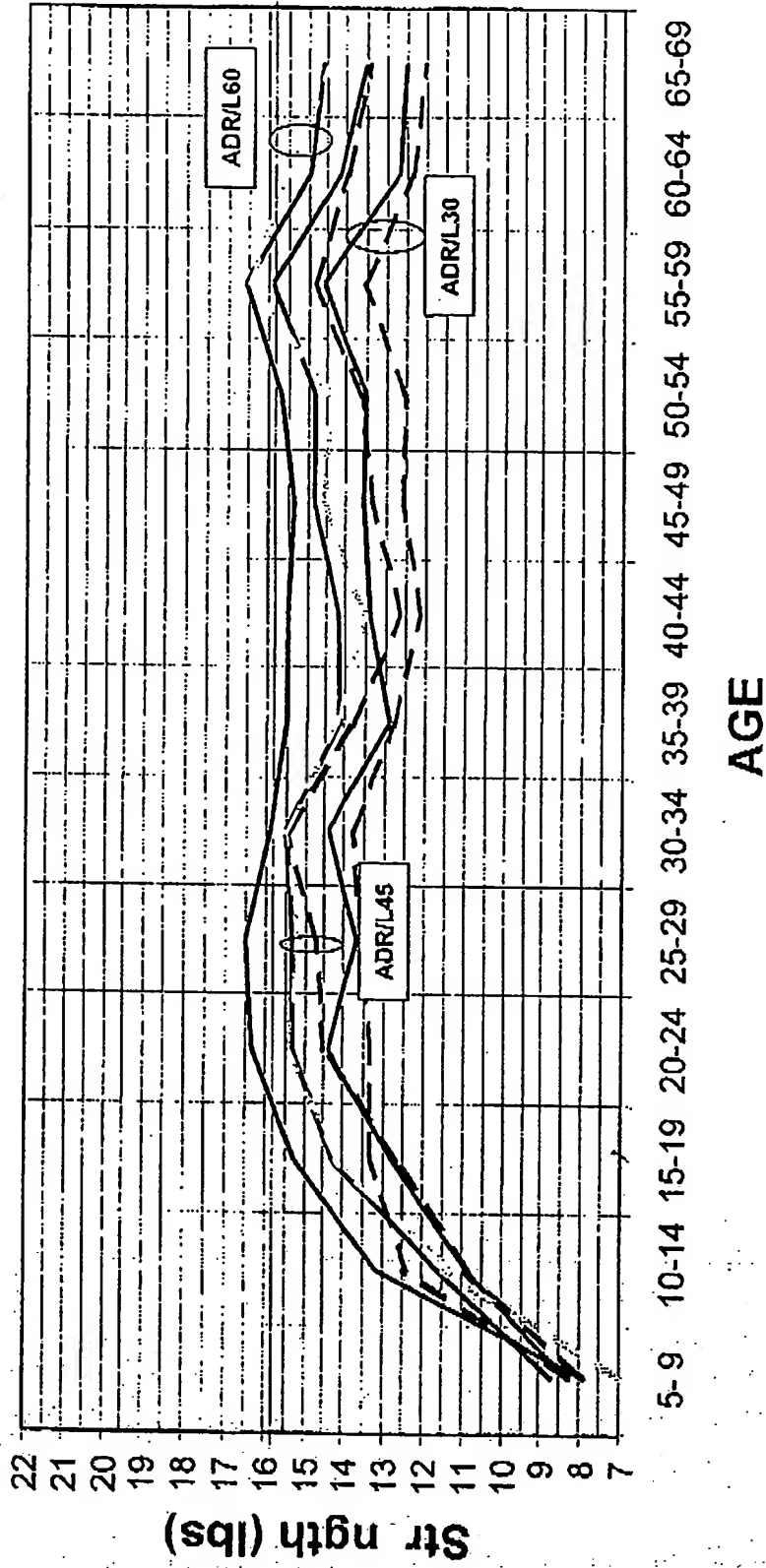


Fig. 27

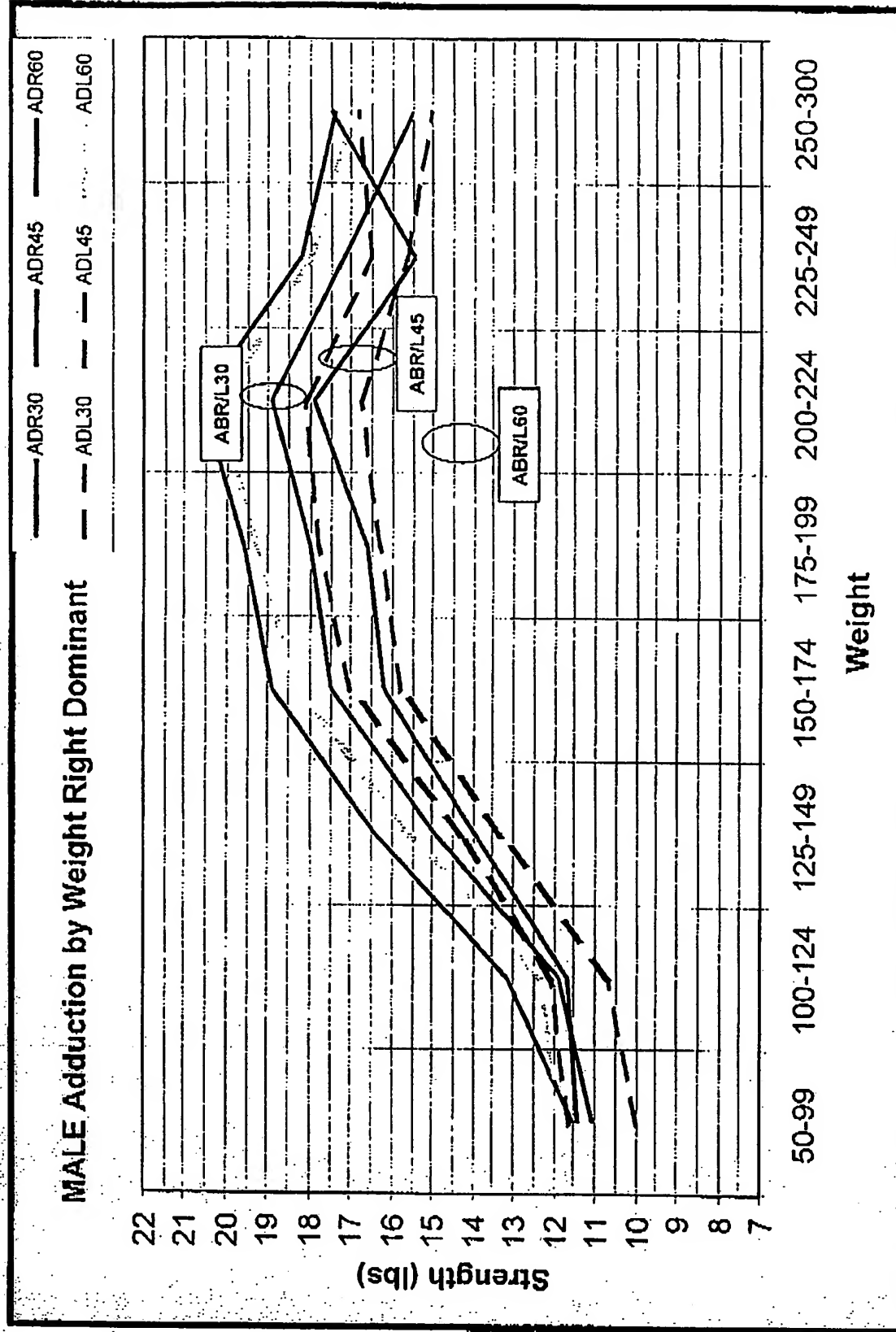


Fig. 28

FEMALE Adduction by Weight Right Dominant

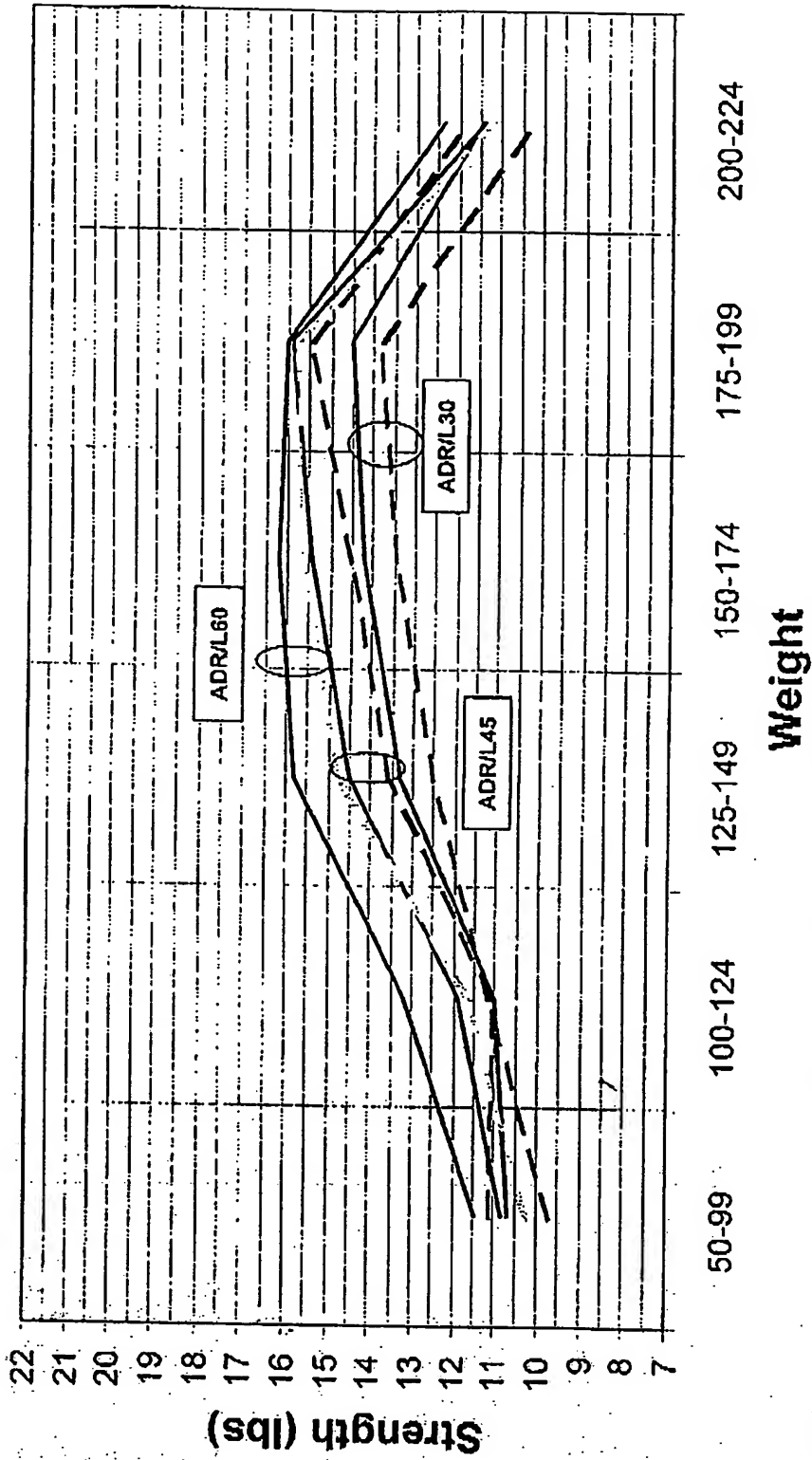


FIG. 29

Male Grip Strength to Abduction and Adduction Left and Right

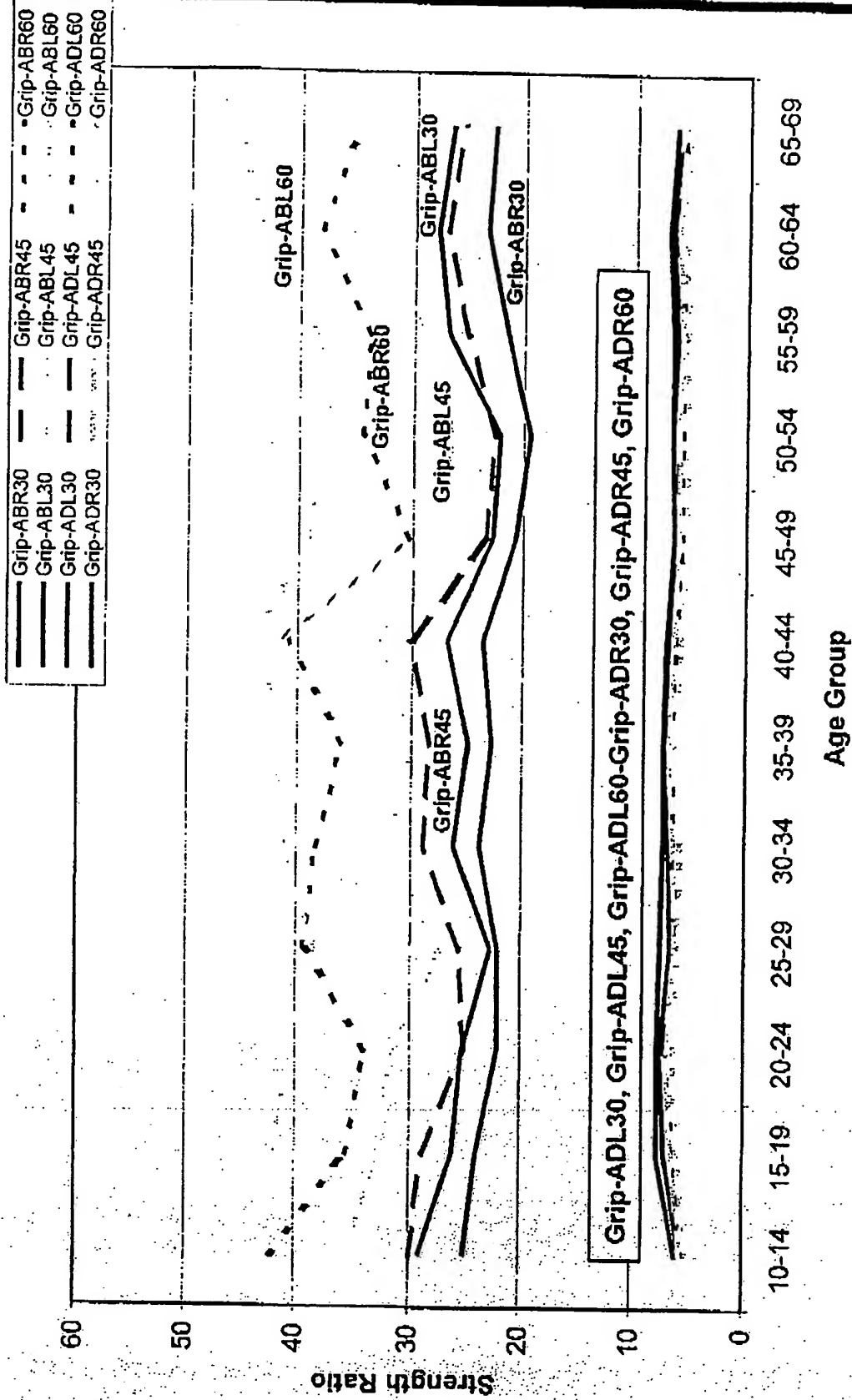


Fig. 30

Correlation Coefficients for All Subjects

Males

Variables	Weight	R-Grip	L-Grip	ABR30	ABR45	ABR60	ADR30	ADR45	ADR60	ABL30	ABL45	ABL60	ADL30	ADL45	ADL60
Age	0.41	-0.16	-0.16	-0.01	0.01	-0.02	-0.11	-0.08	-0.08	-0.07	-0.02	-0.03	-0.07	-0.11	-0.08
Weight		0.46	0.48	0.5	0.46	0.46	0.35	0.35	0.35	0.5	0.46	0.42	0.33	0.33	0.38
R-Grip				0.75	0.67	0.64	0.74	0.73	0.75	0.73	0.64	0.59	0.65	0.65	0.68
L-Grip				0.77	0.69	0.64	0.73	0.72	0.74	0.73	0.69	0.64	0.68	0.68	0.71
ABR30					0.85	0.85	0.62	0.63	0.65	0.84	0.83	0.8	0.57	0.55	0.61
ABR45						0.87	0.55	0.57	0.6	0.78	0.81	0.77	0.52	0.5	0.56
ABR60							0.52	0.55	0.56	0.73	0.75	0.78	0.55	0.5	0.52
ADR30									0.86	0.6	0.56	0.5	0.77	0.73	0.74
ADR45										0.57	0.56	0.51	0.79	0.8	0.82
ADR60										0.6	0.59	0.53	0.79	0.79	0.83
ABL30											0.88	0.81	0.57	0.61	0.6
ABL45												0.87	0.55	0.55	0.57
ABL60													0.51	0.49	0.5
ADL30														0.86	0.82
ADL45															

Females

Variables	Weight	R-Grip	L-Grip	ABR30	ABR45	ABR60	ADR30	ADR45	ADR60	ABL30	ABL45	ABL60	ADL30	ADL45	ADL60
Age	0.52	-0.04	-0.01	0.01	0.07	0	0.07	0.08	0.07	0.03	0.01	0.02	0.06	0.13	0.19
Weight		0.35	0.37	0.23	0.26	0.2	0.28	0.32	0.29	0.21	0.17	0.22	0.26	0.33	0.31
R-Grip				0.58	0.55	0.51	0.56	0.62	0.62	0.42	0.4	0.39	0.49	0.52	0.55
L-Grip				0.49	0.45	0.41	0.53	0.58	0.57	0.49	0.46	0.41	0.56	0.58	0.58
ABR30					0.82	0.73	0.41	0.42	0.48	0.67	0.58	0.56	0.37	0.35	0.38
ABR45						0.81	0.35	0.38	0.43	0.56	0.56	0.57	0.31	0.31	0.34
ABR60							0.32	0.32	0.36	0.51	0.51	0.57	0.3	0.31	0.34
ADR30								0.88	0.85	0.32	0.3	0.23	0.79	0.74	0.71
ADR45									0.88	0.3	0.31	0.26	0.74	0.75	0.74
ADR60										0.36	0.35	0.26	0.72	0.72	0.74
ABL30											0.82	0.63	0.4	0.4	0.4
ABL45												0.77	0.39	0.38	0.41
ABL60													0.3	0.29	0.31
ADL30														0.88	0.8
ADL45															0.86

Fig. 31